No. 3.— *Atlantic Deep-sea Fishes*

By N. A. Borodin

The Museum of Comparative Zoölogy received in 1928 a collection of Atlantic deep-sea fishes from Mr. Columbus O'D. Iselin, a graduate of Harvard College and a student in Oceanography under Dr. Henry B. Bigelow. Mr. Iselin, assisted by eight other young men, mostly graduate students, made in 1928 an exploring trip across the Atlantic between New York, the Azores and England, on the schooner "Atlantis." He succeeded in collecting and preserving in excellent condition many deep-sea fishes, some of them of comparatively large size.

This collection consists of 76 lots, among which are 32 species already known [1] and 6 which are new. Many rare specimens are represented of species established by Brauer and Zugmayer, which are probably not represented in any American museum, including for example *Macrostomias longibarbatus* Brauer, *Macropharynx longicaudatus* Brauer, *Aleposomus eyaneus* Zugmayer, *Bregmaceros macclellandi* Thompson, and *Tetragonurus cuvieri*. This latter is indeed an interesting fish with its cuirass of scute-like scales and tobacco-box-like mouth.

The six new species in the collection of 1928 were:

Avocettina scapularostris, p. 74, pl. 3, fig. 1–3.
Derichthys iselini, p. 75, pl. 3, fig. 4–6.
Lampanyctus peculiaris, p. 77.
Melamphaes bericoides, p. 79.
Pteraclis fasciatus, p. 84, pl. 4, fig. 2.
Aphareus obtusirostris, p. 85, pl. 5, fig. 2.

These have all been described in the Proc. New Eng. Zoöl. Soc., **10**, 1929, p. 109–11.

In 1929 another collection of deep-sea fishes was made by C. Iselin and R. McDonald during their cruise from Woods Hole, Massachusetts, to Bermuda. Although only five hauls were made they obtained 81 lots, which included 49 species already known.[2]

Many other rare fishes were collected on this short trip, as for example: *Ichthyoccus ovatus* (Cocco) known only from the Mediterranean, eastern Atlantic and Indian Ocean; *Nesiarchus nasutus* Johnson, known only from Portugal and Madeira (a specimen 880 mm. long); *Chaulio-*

[1] Thirteen bottles of *Myctophinae* and fifteen bottles of *Cyclothone* have been sent to Mr. A. E. Parr for study.

[2] Two bottles of *Myctophinae* and seven bottles of *Cyclothone* were sent to Mr. A. E. Parr for identification.

dus danae Regan and Trewavas; *Gavialiceps microps* Alcock; *Tilurella nemichthyidis infantis* Roule-Günther; *Photonectes margarita* Goode and Bean, and *Astronesthes niger* Richardson.

The six new species in the 1929 collection were:

Eustomias radicifilis, p. 65.
Aristostomias uncodentatus, p. 66.
Zaphotias nudum, p. 71, pl. 2, fig. 2.
Linophryne longibarbata, p. 83.
Haplophryne simus, p. 83, pl. 4, fig. 1.
Diaphus intermedius, p. 75.

These I described in Proc. New Eng. Zoöl. Soc., **11**, 1930, p. 87–92.

The deep-sea dredgings made on these two short voyages permit us to state once more that the mysterious depths of the ocean evidently remain still far from being fully explored. Nearly every haul discloses new forms.

The area within which these two collections were made is too small for basing a judgment on the geographical distribution of various deep-sea fishes, but the data obtained will be found useful, when combined with the records of other explorations. For this reason, we give below a list of the stations with their soundings, and the species of fish caught at each.

COLLECTION OF 1928

"Atlantis" Station No. 1. Lat. 39° 58′ N.; Long. 29° 46′ W., July 11.
Aphareus obtusirostris Borodin, probably collected from the surface

No. 4. Lat. 40° 49′ N.; Long. 30° 24′ W., July 14.
Argyropelecus hemigymnus Cocco
" *aculeatus* Cuvier et Valenciennes

No. 114. Lat. 41° 18′ N.; Long. 49° 22′ W., July 4, depth 800 fathoms (= 1,463 m.).
Myctophinae sp.
Cyclothone sp.
Chauliodus sloani Bloch and Schneider

No. 115. Lat. 41° 29′ N.; Long. 47° 48′ W., July 5, depth 700–800 fathoms (=1,280–1,463 m.).
Avocettina scapularostris Borodin
Myctophinae sp.
Cyclothone sp.

"Atlantis" Station No. 116. Lat. 41° 30′ N.; Long. 45° 57′ W., July 6, depth 700–800 fathoms (=1,280–1,463 m.).

Melamphaes bericoides Borodin
Myctophinae sp.
Cyclothone sp.
Melamphaes cocles (Vaillant)

No. 117. Lat. 41° 28′ N.; Long. 43° 29′ W., July 7, depth 700–800 fathoms (=1,280–1,463 m.).

Photostomias atrox Alcock
Macrostomias longibarbatus Brauer
Malacosteus niger Ayres
Chauliodus sloani Block and Schneider
Melanocetus krechi Brauer
Myctophinae sp.
Sternoptyx diaphana Hermann
Cyclothone sp.
Melamphaes nigrofulvus Garman
" *megalops* Lutken
" *mizolepis* Günther
Bregmaceros macclelandi Thompson
Pteraclis fasciatus Borodin

No. 118. Lat. 40° 56′ N.; Long. 39° 54′ W., July 8, depth 700–800 fathoms (=1,280–1,463 m.).

Aleposomus cyaneus Zugmayer
Nannobrachium nigrum Günther (=*Lampanyctus niger* (Günther)
Myctophinae sp.
Sternoptyx diaphana Hermann
Cyclothone sp.
Melamphaes mizolepis Günther
" *cocles* (Vaillant)

No. 119. Lat. 40° 05′ N.; Long. 35° 10′ W., July 9, depth 700–800 fathoms (=1,280–1,463 m.).

Myctophinae sp.
Caulolepis longidens Gill
Cyclothone sp.
Melamphaes mizolepis Günther
Tetragonurus cuvieri Risso

No. 141. Lat. 50° 40′ N.; Long. 27° 16′ W., August 28, depth 800–1,000 fathoms (=1,463–1,829 m.).

Nemichthys scolopaceus Richardson
Derichthys iselini Borodin

Eurypharynx pelicanoides Vaillant
Melamphaes cocles (Vaillant)
Myctophinae sp.

No. 143. Lat. 50° 00′ N.; Long. 35° 20′ W., September 2, depth 500 fathoms (–914 m.).
Stomias boa (Risso)
" *elongatus* Alcock
Chauliodus sloani Bloch and Schneider
Myctophinae sp.
Cyclothone sp.
Ceratias couesi (Gill)
Melamphaes unicornis Gilbert

No. 144. Lat. 47° 40′ N.; Long. 37° 20′ W., September 4, depth 600 fathoms (=1,097 m.).
Leptocephalus grassii Eigenmann and Kennedy
Stomias hexagonatus Garman
Chauliodus sloani Bloch and Schneider
Echiostoma barbatum Lowe
Lampanyctus peculiaris Borodin
Nannobrachium nigrum Günther
Myctophum metaclampum (Cocco)
" sp.
Cyclothone sp.
Melamphaes mizolepis Günther
" *unicornis* Gilbert

COLLECTION OF 1929

"Atlantis" Station No. 319. Lat. 34° 50′ N.; Long. 64° 20′ W., August 29, depth 1,500 m.
Myctophinae sp.
Chauliodus sloani Block and Schneider
Eurypharynx pelicanoides Vaillant
Lophodulus acanthognatus Regan
Melamphaes crassiceps Günther
Linophryne longibarbata Borodin
Haplophryne simus Borodin

No. 321. Lat. 33° 50′ N.; Long. 63° 55′ W., August 31, depth 1,500 m.
Myctophinae sp.
Cyclothone sp.
Sternoptyx diaphana Herman
Gonostoma elongatum Günther

Eustomias microcephalus Parr
Echiostoma barbatum Lowe
Malacosteus niger Ayres
Chauliodus sloani Bloch and Schneider
Macropharynx longicaudatus Brauer
Lampadena luminosa Garman
Diaphus dumerili Bleeker
Lampadena minima Tåning
Melamphaes nigrofulvus Garman
" *crassiceps* Günther
Lestidium sp.
Bathylagus atlanticus Günther
Bregmaceros atlanticus Goode and Bean
Dibranchus atlanticus Peters
Nemichthys infans Günther
Garialiceps microps Alcock

No. 322. Lat. 33° N., Long. 64° W., August 31, depth 1,200 m.; net closed.
Myctophinae sp.
Gonostoma elongatum Günther
Argyropelecus hemigymnus Cocco
Sternoptyx diaphana Lowe
Diaphus elucens Brauer
" *hypolucens* Parr
Lampanyctus güntheri Goode and Bean
Lampadena luminosa Garman
Photostomias atrox Alcock
Zaphotias nudum Borodin
Aristostomias uncodentatus Borodin
Eustomias radicifilis Borodin
Nemichtys scolapaceus Richardson
Nemichthys sp.
Serrivomer sector Garman
Anoplogaster cornutus Cuvier and Valenciennes
Nesiarchus nasutus Johnson
Melamphaes bericoides Borodin

No. 323. Lat. 32° 50′ N.; Long. 64° 18′ W., September 2, depth 1,500 m.
Cyclothone sp.
Photonectes margarita Goode and Bean
Gonostoma elongatum Günther
Chauliodus sloani Bloch and Schneider
Malacosteus niger Ayres
Astronesthes niger Richardson

Chauliodus danae Regan and Trewavas
Lampadena luminosa Garman
" *minima* Tåning
Diaphus effulgens (Goode and Bean)
Odontostomus hyalinus Cocco
Caulolepis longidens Gill
Melamphaes crassiceps Günther
" *nigrofulvus* Garman
Serrivomer sector Garman
Gavialiceps microps Alcock
Zaphotias nudum Borodin
Ichthyococcus ovatus Cocco

"Atlantis" Station No. 325. Lat. 37° 00′ N.; Long. 67° 12′ W., September 4, depth 1,500 m. Net closed.
Cyclothone sp.
Sternoptyx diaphana Lowe
Chauliodus sloani Bloch and Schneider
Nesiarchus nasutus Johnson
Chauliodus danae Regan and Trewavas
Eurypharynx pelicanoides (Vaillant)
Lampadena luminosa Garman
" *bathyphila* Tåning
Lampanyctus güntheri Goode and Bean
Nemichthys infans Günther
Serrivomer sector Garman
Leptocephalus congri mystacis Grassi
Tilurella nemychtydis infantis Roule-Günther
Melamphaes crassiceps Günther
Linophryne longibarbata Borodin

Comparing these two collections of deep-sea fishes we note a considerable difference between the character of the fishes caught in 1298 and those taken in 1929. The more southerly cruise of 1929, in the direction of Bermuda, gave in general a more diversified ichthyological fauna than that of 1928 in the northern Atlantic, and more to the eastward.

In the collection of 1929 there are 49 species, while in the collection of 1928 only 32 species.

There are few (and only small-sized) representatives of the families *Melamphaidae, Sternoptychidae,* and but few of the genus *Myctophum* in the collection of 1929, while there are *much more* numerous representatives of the families of *Stomiatidae,* different genera of *Myctophidae,* although but few fishes of the genus *Myctophum.*

Several species were collected exclusively on the northeastern cruise, in the region of colder, less saline water; they are: *Avocetina scapularostris*, *Derichtys iselini*, *Tetragonurus cuvieri*, *Aleposomus cyaneus*, all species of the genus *Stomias* and *Macrostomias longibarbatus*.

Other species were found only on the southwestern cruise to Bermuda, namely: *Linophryne longicaudata*, *Haplophryne simus*, *Dibranchus atlanticus*, *Nesiarchus nasutus*, *Zaphotias nudum*, *Aristostomias uncodentatus*, *Anoplogaster cornutus*, *Odontostomus balbo*, *Serrivomer sector*, and *Tilurella* (larva of *Nemichtys*).

These two collections, though small, seem to indicate that two regions situated comparatively near each other, but differing in hydrological conditions, may have different fish communities.

The value of using a closing net is worth noting: at Stations No. 322 and 325, when the net was hauled closed, the catch was the richest in quantity and diversity of fishes caught, and the capture of a large specimen of a rare fish — *Nesiarchus nasutus* Johnson (about two feet long) was possible only because the net on this occasion was successfully closed.

ANNOTATED LIST OF THE ATLANTIC DEEP-SEA FISHES, COLLECTED BY C. ISELIN AND ASSOCIATES

ALEPOCEPHALIDAE

Aleposomus cyaneus Zugmayer

Plate 1

M. C. Z. No. 31,653, Station 118.

This rare fish, known only as a unique specimen briefly described by Zugmayer (Bull. Inst. Oceanogr., Monaco, 1914, No. 288, pp. 1–2), deserves a full description and illustration. Zugmayer wrote that the fish resembles *A. lividus* Brauer, but differs from it by having different dorsal and anal fins and smaller head. The only measurements given by this author are: D. 30; A.27; head 4.15; lateral line without scales, in which it differs from *A. squamilaterus* Alcock. Specimen was 150 mm. long and caught at Station 3,312, at 3,500 meters.

Our specimen is probably identical with Zugmayer's type, but we cannot be entirely sure, not having a description accompanied by a drawing. We, therefore, consider it necessary to redescribe the species.

Specific characters.— Head 4 in body; lateral line is perfectly visible

and consists of dash-like fine tubes and small pores, without any trace of scales, even rudimentary or subcutaneous.

D. 31; A.28; P. 7; V. 7.

Description of the specimen, Museum of Comparative Zoölogy No. 31,653, 175 mm. long, caught at Station No. 118 from a depth of 700–800 fathoms in the North Atlantic Ocean. Body much compressed and high, depth 5, scaleless, with well pronounced striae of muscles and lateral line; head high and large, 4 in body, its height $1\frac{1}{3}$ in the length. Snout short, blunt, $5\frac{1}{2}$ in head; eye large, round, 3 in head, with visible eyelid, slightly projecting over the head surface. Head and cheek have uneven surface; a cavernous snout has a slight prominence in front of the eyes. Maxillae reach the middle of the eye. Lower jaw with a short spine at its lower end. Minute villiform teeth on the borders of both jaws and in many rows on the palatine. Dorsal fin low and long, its origin a little in front of the vertical, passing through vent.

Anal similar to the dorsal, a little shorter.

Ventrals are inserted in the middle of the body; they are short, not reaching the vent. Pectorals short. Both ventrals and pectorals are about $\frac{1}{2}$ of body's height. Caudal deeply forked, its lobes have filamentous rays. At its base there are many rudimentary rays descending on the peduncle for about halfway to the anal and dorsal. Short filaments can be observed on the rays of all other fins. The skin is thin and covers the body loosely: the specimen has many large skin-plays on the back and belly. A great many round nodules are scattered all over the body and on the fins, and being of the same color as the skin — deep black — they are scarcely visible at first sight.

A large leathery flap is present on the margin of the opercle. Lateral line is perfectly visible; it is slightly produced, and consists of a line of alternate dash-like tubes and pores. No trace of any kind of scales could be found.

The naked body presents an elaborate pattern of muscle distribution on both sides of the lateral line; the muscular striae are well developed, and seem to be very characteristic.

Coloration of the body, deep black with a violet shading; head and fins dark brown.

Zugmayer considers *A. lividus* Brauer (Tiefsee Fische "Valdivia," taf. 2, fig. 1) as nearest to his type, but it differs in having shorter dorsal and anal fins. In the general form of the body and size of the dorsal and anal fins, *A. cyaneus* Zugmayer more nearly resembles *Xenodermichthys nodulosus* Günther and *X. squamilaterus* Alcock. Our specimen differs, however, from both in the absence of any scales

(rudimentary in *X. nodulosus*, or subcutaneous in *X. squamilaterus* Alcock), by a much larger head and eye, and longer maxillae. It differs also from *X. socialis* Vaillant, which has a much longer snout and no visible lateral line.

Two genera, *Aleposomus* and *Xenodermichthys*, resemble each other so closely that they are still confused by many authors. Brauer recognizes no difference between them, and gives the name *Aleposomus* for both (l.c., p. 20–21). Roule (Bull. Mus. Hist. Nat., **21**, 1915, pp. 42–46) made a short revision of these genera and found that they were distinct, the principal difference between them being in the number of rays in dorsal and anal fins, more than 25 in *Xenodermichthys* and less than 25 in *Aleposomus*. Jordan suggested the creation of a new genus *Rouleina* (Classification of Fishes, 1923, p. 122) not giving, however, any description of this new genus.

Recently McCulloch (1926, pp. 162–165), on the basis of the same fishes obtained by the Steamer "Endeavor," made another revision of these genera, and found that the proposed genus *Rouleina* of Jordan should be considered only a subgenus. He suggests that the two genera and one subgenus be distinguished principally on the basis of the size of the gill openings, which, according to him, do not extend above the pectorals in the case of *Xenodermichthys*, and which extend well above the pectorals in the subgenus *Aleposomus* and the subgenus *Rouleina*. The two subgenera differ in that the former has more than 25 rays and the latter 20 or less rays.

Our specimen, according to this new scheme, would belong to the subgenus *Aleposomus*. We must, however, state that there is still not sufficient material for making a final revision of these genera. Most of them were described on the basis of a single specimen, the only exception being *X. socialis* Vaillant which was caught in great quantities (more than a hundred).

BATHYLAGIDAE

Bathylagus atlanticus Günther

Cruise 1929, No. 61, Station 321.

Two small specimens 34 and 31 mm. long, without caudal, have the following characters: both depth and head 4 in body's length; eye enormous, $1\frac{3}{5}$ in head; snout 8 in head; interorbital space $2\frac{1}{2}$ in eye. D. 8, short, A. 12, long, but low, P. 7, almost as long as head, narrow and directed forwards ,V. 6, short, adipose on the vertical of the third

ray of the anal, situated near to the caudal. All vertical fins are set on a ridge of skin elevated over the level of the body. Small teeth in the small mouth, on the lower jaw only.

CHAULIODONTIDAE

Chauliodus sloani Bloch and Schneider

M. C. Z., No. 31,607, Station 117.

Three specimens, the largest 225 mm. long; No. 31,608, Station 143, six specimens, all but one nicely preserved. The stomach of one specimen, 137 mm. long, was entirely denuded and out of the body. The stomach contained: backbone of a deep-sea fish, 50 mm. long; a mass of half digested fish muscles; about a dozen spheres and hemispheres, which must be eyeballs and light-organs of deep-sea fishes. Specimens, Museum of Comparative Zoölogy, No. 31,609, Station 114 and No. 31,610, Station 144 are young, 57–60 mm. long.

Four more specimens were collected during the cruise 1929:

Station 319, original no. 4
Station 321, original no. 6
Station 323, original no. 5
Station 325, original no. 7

Chauliodus danae Regan and Trewavas

Cruise 1929, No. 54a, Station 323
Cruise 1929, No. 54, Station 325

STOMIATIDAE [1]

Stomias boa (Risso)

M. C. Z. No. 31,605, Station 143.

Stomias elongatus Alcock

M. C. Z. No. 31,604, Station 144.

[1] C. Tate Regan and Ethel Trewavas published recently a comprehensive work on the fishes of the families *Stomiatidae* and *Malacosteidae* ("Dana" Exped. Ocean. Rept. No. 6, issued March, 1930). According to the revision by these authors, a new family of *Malacosteidae* is formed, in which the genera *Photostomias* and *Aristostomias* are placed, besides the genus *Malocesteus*.

Many new species of *Eustomias* and *Aristostomias* are described in the paper, but none correspond with *Eustomias radicifilis* Borodin and *Aristostomias uncodentatus* Borodin, the descriptions of which were published January 30, 1930 (Proc. New Eng. Zoöl. Club, **11**, p. 89–90.

Stomias hexagonatus Garman

M. C. Z. No. 31,606, Station 144.

Three specimens, 100, 200 and 230 mm. long, nicely preserved, for even the iridescence of the skin remained.

Macrostomias longibarbatus Brauer

M. C. Z. No. 31,601, Station 117.

Two specimens, perfectly preserved.

Photostomias atrox (Alcock)

M. C. Z. No. 31,603, Station 117.

Cruise 1929, Station 322; original no. 26.

Echiostoma barbatum Lowe

M. C. Z. No. 31,602, Station 144.

Two specimens, 70–75 mm. long (probably young, as compared with specimen taken at Station No. 321, see below).

There is some difference between our specimens and the description and drawing of Goode and Bean (1896, p. 109, fig. 130). Ours have a differently shaped barbel, and much longer ventral fins, the filaments of which reach the anal. Günther's drawing of *E. barbatum* (1887, pl. 53, fig. 13) corresponds better than that of Goode and Bean, the only difference being that it does not show the characteristic filamentous end of the barbel; possibly it has been torn off.

One more character of this fish is worth mentioning: a well pronounced red spot under and behind the eye, which probably is a suborbital luminous organ.

The specimen caught in 1929, at Station 321, is 255 mm. long (adult) and does not differ from Goode and Beans' description and figure 130.

Eustomias radicifilis Borodin

Proc. New Eng. Zoöl. Club, **11**, 1930, p. 89.
Type, M. C. Z. No. 32,268.

The most closely related species are *E. filiferum* Gilchrist and *E. enbarbatus* Welsh, but these have a shorter and differently shaped barbel, the structure of which more closely resembles *E. binghami* Parr (Parr, pp. 76–80).

Aristostomias uncodentatus Borodin

Proc. New Eng. Zoöl. Club, **11**, 1930, p. 90.
Type, M. C. Z. No. 32,266.

This species differs from *A. grimaldii* Zugmayer (*A. titmanni* Welsh) in having a regular row of luminous side organs (not in groups), from *A. scintillans* Gilb in having a longer barbel, and from both of them in having fangs on both jaws and low, short fins.

Malacosteus niger Ayres

M. C. Z. No. 31,612, Station 117.

Two specimens, the larger 130 mm. long.

I would like to mention one thing about this peculiar deep-sea fish, unnoticed since Ayres' (1849, p. 53) description thereof. These fish always come out of the net almost dead, with mouth widely open. This is caused by the full extension of a rubber-like tendon, attached at its anterior end to the mandible between two fangs, and at the posterior end to the branchial arches, where it is divided into two branches. This tendon serves to bring the whole folding frame of the jaws back, after extending it for the purpose of opening the mouth and catching the prey.

Something similar is shown in fig. B, pl. 54 of Günther's Deep-sea Fishes, Challenger expedition, but the point of the posterior attachment is not correctly shown, and no word is said in the text about this most peculiar part of the mouth apparatus. In plate 3, fig. 2, Zugmayer (1911), this tendon is better shown, but the posterior end is directed too high. The function of the mechanism, however, is well explained by this author on the basis of Günther's description thereof for other Stomiatid fishes.

Five more specimens of this species were collected during the cruise of 1929 — two, each 80 mm. long, at Station 321, and three, 69, 85 and 110 mm. respectively, at Station 323.

Photonectes marginata (Goode and Bean)

Echiostoma marginata Goode and Bean, Ocean. Ichth., p. 109, fig. 131.

A large specimen (240 mm. long, without tail) of this rather rare fish was collected at Station No. 323, cruise 1929. Measurements and description of this specimen follow: depth, 55 mm. (measured at the posterior higher half of the body); head short, 52 mm. long and 35 mm.

high (very low). Lower jaw curved. Body fleshy, thick and rounded on back and belly. Only the anterior part of the body with the head, one-fifth of the total in all, and the posterior one-fifth, are compressed.

Dorsal and anal fins very high, covered with skin; ventral with very long filaments, two last ones the longest, reaching the ends of middle rays of the anal. Pectoral (only on one side, on the other torn off) — with one wire-like, rigid ray, 70 mm. long, originating a little above the row of luminous organs. Caudal short, only 15 mm. long. Barbel 23 mm. long, $2\frac{1}{2}$ in the length of the lower jaw, with six filaments and no bulb. Photophores on the body well defined; one row near middle of body's depth, and another on the belly.

The skin on the body thick, but often torn and ragged; a pectoral is gone, probably with the skin. Coloration dirty, dark gray. Stem of the barbel brown, its filaments white. Suborbital luminous organs rose-colored.

ASTRONESTHIDAE

Astronesthes niger Richardson

Astronesthes niger Richardson, Voy. "Sulphur," Ichthyology, p. 97, pl. 50, figs. 1–3.

Astronesthes myriaster Zugmayer, Bull. Inst. Ocean., Monaco, No. 253, 1913, p. 4.

Astronectes niger Regan, Dana Expedition. The Fishes of the family Astronesthidae and Chauliodidae, 1929, p. 20.

A single specimen of this rather rare fish was collected at Station No. 323, cruise 1929, 33 mm. long (without caudal). So far as known, there are only two specimens of this species in the American museums (labeled as *Chauliodus fieldii* Cuvier and Valenciennes), one of which is in the United States National Museum (Goode and Bean, 1896, p. 105), and the other in the Bingham Oceanographic Collection Yale University.

Zugmayer redescribed it as *A. myriaster*. His description is rather incomplete; he emphasizes particularly the most important character of this species, a great many small luminous spots on the skin, which suggested to him a very proper name "myriaster," i.e. thousand stars.

Regan, however, after comparing two of Zugmayer's type specimens in the Paris Museum with many specimens obtained by the recent "Dana Expedition," came to the conclusion that Zugmayer's type-specimens are *A. niger* Richardson. *A. myriaster* is, therefore, a synonym of *A. niger* Richardson.

Here are some measurements and details of our specimen. Depth 8 mm. (a slight difference from Richardson's type may be due to the immaturity of the specimen), 3.3 in length; eye 2 mm. (5 in head); snout 3 mm. (3.3 in head); D. 13, long and high, its origin behind ventrals; A. 6, short and low; P. 5, long, almost reaching ventrals; V. 4, long, reaching half way to the anal; caudal 5 mm. long. Mouth large, teeth on both jaws long, strong, not depressible. Two fangs on the lower and four on the upper jaw. Barbel 8 mm. long with an elongate whitish bulb. No conspicuous luminous organ on the head or body, but the skin on the belly and head is covered with small tubercles, which make it shagreened. Besides that, there are also numberless spots all over the body which are probably luminous. This is a very important character, which distinguishes *A. niger* and *A. indicus* from the other *Astronesthes*. This is strongly emphasized by Richardson and Zugmayer, but not mentioned in Regan's synopsis of the species.

STERNOPTYCHIDAE

Argyropelecus aculeatus Cuvier and Valenciennes

M. C. Z. No. 31,631, Station 322.

A well preserved specimen, 65 mm. long.

Argyropelecus hemigymnus Cocco

M. C. Z. No. 31,634, Station 322.

It is of some interest that both species of this genus were taken dead in 1928 at the same station, from the surface of the water, and that in no haul of that cruise were these species caught.

Sternoptyx diaphana Herman

M. C. Z. No. 31,632, Station 118.
M. C. Z. No. 31,632, Station 117.
Cruise 1929, Station 322.
Cruise 1929, Station 323.

MAUROLICIDAE

Ichthyococcus ovatus (Cocco)

Plate **2**, fig. 1

This rare fish has not yet been adequately described, evidently because of the few specimens examined. The drawings accompanying the descriptions made by Cocco, Bonaparte, Vaillant, Goode and Bean, and Brauer differ so much that I find it necessary to give here a full description and a drawing of the first specimen to be reported from the western Atlantic.

Specific characters.—Br. 11; D. 10; A. 12; P. 6; V. 8; C. 22; L. L. 32.

Description of the single specimen No. 32,292, taken at Station 323, 22 mm. long (without caudal).

Body short, deep, compressed, covered with scales, its depth $2\frac{3}{4}$ in length. Head high, narrowly compressed, 3 in body and about as high as long. Eye $3\frac{1}{2}$ in head, higher than broad. Interorbital very narrow. Snout short, obtuse, 3 in head. Mouth small. The lower end of the opercle descends far down and covers a portion of the lower jaw (see drawing). Margins of upper jaw finely denticulated. The anterior branchial arch extends forward to behind the symphysis of the lower jaw. Gillrakers short.

All the fins are supplied with slender, brittle rays. Dorsal high, its origin in the middle of body; anal low; pectoral as long as head; ventral only half so long; caudal forked; adipose fin fringed, very long, with conspicuous rudimentary rays of unequal length. There is a short fin, similar to adipose, between ventral and anal.

The scales of our specimen have been lost, but according to their impressions can be easily counted. Opercle and head naked.

Luminous organs numerous, of large size and arranged in regular rows (see drawing). There is one below the eye, one at the angle of the preopercle, two on the opercle, and eight between branchiostegals along the lower jaw and isthmus. On the belly the luminous organs are arranged in two rows: in the lower row there are 14 in the space between pectoral and ventral and 8 from ventral to anal; in the upper row 14 between pectoral and ventral and 10 between ventral and anal, 12 over the anal, and two leading to the caudal in a single row.

Body dusky; head colorless with the exception of some irregular star-like chromatophores on the cheeks.

There was some hesitation about the identification of this fish, be-

cause of the discrepancies in the description and drawings given by different authors. All authors, with the exception of Cocco, who discovered this fish, emphasized that it is scaleless and this character is the principal one for the *Maurolicidae* family, while our specimen shows so distinctly the traces of the missing scales that it cannot be admitted that it had no scales. Only after reading the original Italian description by Cocco, was I convinced that his Mediterranean specimens had scales.

The drawings made matters worse; no adipose fin is shown in the drawing by Cocco, Vaillant or Goode and Bean; a short one with only three rudimentary rays in second dorsal, i.e. adipose, is shown in the drawing in Bonaparte's paper, and the only adipose similar to that of our specimen is on the drawing accompanying the description of an Indian specimen of this fish by Brauer. The adipose fin with a long base and the presence of a short pre-anal adipose must be recognized as the most marked specific character of this rare fish.

This fish, according to Cocco, is rare even in its native sea, the Mediterranean. It was found by the "Talisman" expedition in the eastern Atlantic, not far from the Mediterranean, and later in the Indian Ocean by the "Valdivia" expedition. It was unknown in the western Atlantic, and, therefore, its recent discovery near the American coast is of particular interest.

After a careful comparison of the measurements and characters of our western Atlantic specimen with the descriptions heretofore given, I am convinced that there is no reason to propose a new specific name.

Here are the principal characters of the specimens from different seas:

	Medit. (Cocco)	East. Atl. (Vaillant, after drawing)	Indian (Brauer)	West. Atl. (mihi)
Depth	3	$3\frac{1}{4}$	2.8	$2\frac{3}{4}$
Head	3	$3\frac{1}{4}$	3–3.4	3
Eye	—	3	3	3
D.	13	11	11–12	10
Adip.	3 rudimentary	none	numerous rays	fin rudimentary
P.	8	—	8	6
V.	6	—	7	8
A.	16	12	14–15	12
L. l.	—	36	38	32

A few words more about the characters of the *Maurolicidae*. The name was proposed by Jordan and Evermann for the group *Coccina* of the *Sternoptychidae* Günther (Cat. Brit. Fish., **5**, 1864, p. 384). An

important character was the structure of the branchial system, which has been included in the family's characters, namely, the anterior branchial arch extending forward to behind the symphysis of the lower jaw. The body has been called "scaleless," but the *Sternoptyehidae* include species both with scales and without. *Ichthyococcus* is surely nearer to *Maurolicus* than to *Sternoptyx* and its allies, but its body is covered with scales so that, it seems, it would be proper to regard the *Maurolicidae* as "scaleless or covered with scales," as was previously given in the description of the *Sternoptichidae*.

Zaphotias nudum Borodin

Plate 2, fig. 2

Proc. New Eng. Zoöl. Club, **11**, 1930, p. 88.
Type, M. C. Z. No. 32,291, seven paratypes.

The size and form of the anal presents the best character for recognizing fishes belonging to the genus *Bonapartia* (Goode and Bean, 1896 = *Zaphotias* Jordan and Evermann, 1898).

The photophores are very numerous, and some of them are placed in somewhat unusual places, as for example on the branchiostegal membrane, where there is one photophore for each of the twelve branchiostegals. They are very conspicuous, and are seen from the outside through the transparent bones as a very regular row of short vertical bars, but examined from the inside, they show the usual structure of photophores and are comparatively large in size. They are mentioned by Goode and Bean (1896, pp. 102–103) in their description of the only two known specimens of their new genus and species called *Bonapartia pedaliota* as a "series of vertical elongated spots, apparently phosphorescent, on either side of the lower jaw, giving it a pectinate appearance," and they are shown in figure 120 accompanying their description. There is no doubt that in the species *B. pedaliota*, the photophores are also situated on the branchiostegal membrane, as with our species.

Besides these twelve photophores there is a regular row of small, single photophores on the ventral portion of the body, closely set one to the other; 14 between the pectoral and ventral and 5 between the ventral and anal; 13 large, double photophores on the supra-anal area and 6 of the same kind between anal and caudal; the two last are set close to each other, but without ascending to the upper base of the peduncle. There is one photophore at the angle of the preopercle, but none on head or sides of body.

Coloration of specimens in alcohol absent, with the exception of a slightly darkened back, nape of head and base of caudal, and of phosphorescent opercle. No dark traces of scales.

The monotypic genus *Bonapartia* was introduced in 1896 by Goode and Bean (p. 102). The only known specimens up to the present, two, 1 to 2 inches (26–52 mm.) long, were taken by the "Albatross" at Station 2,642 in 25° 20′ 30″ N. Lat., 70° 58′ W. Long., at a depth of 217 fathoms (about 434 metres), in the Gulf Stream. The name *Bonapartia* being preoccupied, Jordan and Evermann (1898, p. 580 and p. 2,826) changed it to *Zaphotias*, and the only known species of which the two type specimens are in the United States National Museum, No. 44,337, is *Zaphotias pedaliotum* (Goode and Bean).

Our new species is the second one of this genus. It has all the most important generic characters, such as general disposition of photophores, very similar radial formula and a peculiar form of long-rayed falcate anal fin. But there are several characters, not included in the generic diagnosis, as given by Goode and Bean, namely, the absence of scales, absence of photophores on the caudal peduncle above the single row along the whole ventral line of the body, teeth of two sizes on the jaws, and forked caudal.

The discovery of another new species, undoubtedly belonging to this genus, suggests the introduction of the following additional characters to the generic diagnosis given by Goode and Bean.

Body scaleless or covered by scales; photophores on the branchiostegal membranes and in a single row along the whole ventral line of the body to the base of the caudal; photophores on the peduncle present or absent. Caudal forked; teeth on both jaws of equal or unequal size.

The new species differs from the *Z. pedaliotum* (Goode and Bean) in having teeth of unequal size and the absence of scales and photophores on the peduncle. There are more photophores, 38–39 being counted on 8 specimens (not including 12 on the branchiostegals), while in *Z. pedaliotus* they number only 35. The photophores above and behind the anal fin are conspicuously larger in size, double, and not so closely set as those of the anterior portion of the body, which appear as small dots. In this respect our species again differs from *Z. pedaliotus*.

The caudal fin was missing or so badly damaged in the specimens of Goode and Bean that they questioned whether it was "*subtruncate*," accompanying this word with "probably" in parenthesis (l.c., p. 102). This can positively be changed to "*forked*," because our specimens all have very well defined furcation.

ANGUILLIDAE

Leptocephalus grassii Eigenmann and Kennedy

M. C. Z. No. 31,672, Station 144.
Cruise 1929, Station 325.

These are larvae of the American eel, *Anguilla chrysypa* Rafinesque.

NEMICHTHYIDAE

Nemichthys infans Günther

Cruise 1929, Station 321.
Cruise 1929, Station 325.

Tilurella nemichtydis infantis Roule and Günther

Cruise 1929, Station 325.

This is the larva of *N. infans*.

Nemichtys scolopaceus Richardson

M. C. Z. No. 31,669, Station 141.
Cruise 1929, Station 322.

A well preserved specimen.

Nemichthys sp.

One of the nemichtyoid fishes of the collection, unfortunately badly damaged in the pectoral portion, differs from others in having a considerable sac under the lower jaw, partly recalling a large sac of the fishes belonging to the family *Saccopharyngidae*, but differently situated and small in size. This sac is formed by a branchiostegal apparatus, its membrane being extended in the form of a sac, on the sides of which seven branchiostegal bones are easily visible (see pl. 5, fig. 3).

This strange sac together with some other differences from known species of *Nemichthys* induce me to make a full description of the fish, as a possible new species, but I do not characterize it formally, because of the mutilation of the specimen.

Description of a single specimen, No. 32,299, 173 mm. long, collected at Station No. 325, cruise 1929. The worm-shaped body, somewhat

twisted by the preservative, probably tapering to the filamentous tail, is scaleless, and its greatest depth (measured in the region of the head) is more than 80 times in its length and 15 times its head. Head, measured from the tip of the beak to the ends of branchiostegals, forming the skeleton supporting the said sac, is $5\frac{1}{8}$ in body's length. Eye small, 30 times in head, situated over the junction of the jaws. Snout $2\frac{1}{2}$ in head; the beak has the typical form of Nemichtyoid fishes with the upper jaw (the longer) bent upwards. The sac is as long as the snout and half as deep (it probably has shrunk in alcohol).

Both jaws have numerous, well developed teeth, different in shape from *N. infans* Günther. The only fin which could be found, the anal, is long and has hairy rays, twice as long as the depth of the body, evidently with large interspaces between them. The origin of this fin is at a point $\frac{1}{3}$ way above the body's length. It does not reach the tip of the tail, which is without any rays.

It must be remarked that the skin in the region of pectoral and ventral fins is entirely torn off. Twisted body and damaged skin on the back make it impossible to say anything about the dorsal fin.

Coloration dark brown all over, with the exception of the tail, which is white.

Gavialiceps microps Alcock

Cruise 1929, Station 321.
Cruise 1929, Station 323.

Serrivomer sector Garman

Cruise 1929, Station 322.
Cruise 1929, Station 325.

Avocettina scapularostris Borodin

Plate **3**, fig. 1–3

Proc. New Eng. Zoöl. Club, **10**, 1929, p. 109.
Type, M. C. Z. No. 31,671.

Coloration yellowish white; upper part of the head, tip of the snout and of the tail dusky, and dotted with small round pores.

Our species differs very distinctly from the three other known species of the genus *Avocettina*, established by Jordan and Davis, namely, *Avocettina* (*Nemichthys*) *infans* (Günther) — generic type; *A. elongata* Jordan and Evermann and *A.* (*Labichthys*) *bowersi* (Garman), in having an entirely different snout, shorter body and filamentous tail, as well as by several other characters.

DERICHTHYIDAE

Derichthys iselini Borodin

Plate 3, fig. 4–6

Proc. New Eng. Zoöl. Club, **10**, 1929, p. 110.
Type M. C. Z. No. 31,670.

Coloration gray-yellow, with dusky subcutaneous dots; belly ruddy brown.

This species differs from the type species *Derichthys serpentinus* Gill by the form and position of the nostrils, by a very conspicuous lateral line and by a differently shaped dorsal fin. It is worth mentioning that the peculiar form of the nostrils of our fish does not correspond to the family or the generic characters given by Gill, on the basis of a single specimen (U. S. N. M. No. 33,523). According to him: "nostrils lateral; in front of the eye; neither tubular" (Goode and Bean, 1896, p. 161). But with this exception, our new species which, without any doubt, belongs to this group of rare long-necked deep-sea eels, has the characters of the family and the genus. It was named for Mr. C. Iselin, who collected these fishes.

SACCOPHARINGIDAE

Eurypharynx pelecanoides (Vaillant)

(Syn. Macropharynx longicaudatus Brauer)

M. C. Z. No. 31,613, Station 141.
M. C. Z. No. 31,614, Station 141. Very well preserved specimen.
Cruise 1929, Station 319.
Cruise 1929, Station 325.

MYCTOPHIDAE

Diaphus intermedius Borodin

Proc. New Eng. Zoöl. Club, **11**, 1930, p. 89.
Type M. C. Z. No. 32,289, and one paratype.

The most nearly related species is *D. coeruleus* Klunzinger, which has a different form of the upper antorbital organ (vertically oval and not triangular); differing radial formula, different number of photophores and scales in the lateral line.

It must be remarked that *D. coeruleus* is known only from the Indian Ocean.

Diaphus metaclampus (Cocco)

M. C. Z. No. 31,615, Station 144.

Diaphus dumerili Bleeker

Cruise 1929, Station 321.

Diaphus elucens Brauer

Cruise 1929, Station 323.

This specimen differs slightly from Brauer's type in having 18 rays in dorsal fin instead of 14, and the eye 3 times in head instead of 3.5. In this respect and in the number of supra-anal photophores, it approaches *D. fragilis* Tåning, which unfortunately is not yet fully described.

Here are some characters of our specimen: length 66 mm.; depth 14 mm.; head 18 mm.; D. 18; A. 16.

Diaphus effulgens (Goode and Bean)

Cruise 1929, Station 323.

Lampanyctus niger (Günther) = Nannobrachium nigrum Günther

M. C. Z. No. 31,629, Station 118.
M. C. Z. No. 31,630, Station 144.

There was at first some doubt as to the proper identification of our specimens, whether *N. nigrum* (Günther) or *N. macdonaldi* Goode and Bean. Measurements were made and parallel data concerning the two known species have been compiled and the result presented in the following table:

Nannobrachium (= Lampanyctus)

	M. C. Z. No. 31,629	*N. nigrum* Günther (Challenger Deep-sea Fishes, p. 199, pl. 60, fig. 13)	*N. macdonaldi* Goode and Bean (Ocean. Ichthyology, p. 94, fig. 110)
Depth	7	5½	5
Head	4½	3⅔	3½
Eye	6	5	5
Snout	5	5	—
Scales in L. L.	35	34	35
D.	15	14	13
A.	T. 20	19	16–17
P.	6	3–4	3
V.	7–8	—	—
Color	Brown-black	Black	Purplish brown
Size	2½ inches	4½ inches	5 inches

As a result of this comparison it is possible to conclude that all three specimens belong to one and the same species, and, by priority, they then must be called *N. nigrum* Günther. Our specimen differs from Günther's type more than from *M. macdonaldi*, namely by the depth and head's height, but having in view that our specimen may be a young one, the said differences may be ascribed to its age.

Lampanyctus peculiaris Borodin

Proc. New Eng. Zoöl. Club, **10**, 1929, p. 111.
Type, M. C. Z. No. 31,628.

None of the species included in the works on deep-sea lantern fishes — Goode and Bean, Garman, Brauer, Zugmayer, Tåning, Parr — correspond to our species, because their adipose fins are not rayed.

The nearest species is *L. caudispinosus* (Johnson), but its dorsal fin has 26 rays, its pectoral is short, and its adipose fin is of ordinary structure.

Lampanyctus güntheri Goode and Bean

Cruise 1929, Station 322.
Cruise 1929, Station 325.

Caudal fin with black bars beautifully arranged. Eyes a bright shining blue.

Lampadena luminosa Garman

Cruise 1929, Station 321.
Cruise 1929, Station 325.
Cruise 1929, Station 322.

Lampadena minima Tåning

Cruise 1929, Station 321.
Cruise 1929, Station 323.

GONOSTOMIDAE

Gonostoma elongatum Günther

Cruise 1929, Station 321, 6 specimens.
Cruise 1929, Station 322.
Cruise 1929, Station 323.

ODONTOSTOMATIDAE (=SCOPELARCHIDAE)

Odontostomus balbo Risso, new subspecies atlanticus

Cruise 1929, Station 323.

A single specimen of this interesting fish, No. 32,280, 77 mm. long (without caudal) presents the following characters: depth 6; head 4.3 in the body's length. Eye $3\frac{3}{5}$ in head, telescopic, looking upwards. D. 12; A. 34; P. 12. Caudal forked, 7.7 in body's length. Long fangs on the palate and on the lower jaw. They are depressible, a character which is not emphasized enough in the synopsis of Goode and Bean (l.c., p. 121) and Parr (l.c., p. 163).

This species has been known only from the Mediterranean. The only difference between Risso's type and our new subspecies (according to the description given by Goode and Bean and the figure given by Günther, 1887, plate 52, fig. A) consists in coloration: the Mediterranean species is colorless, while ours is grayish with well marked iridescence on cheeks and peduncle.

PARALEPIDIDAE

Lestidium sp.

Specific characters.— Body scaleless, short; depth $7\frac{1}{2}$; head very long, 3 in length; eye large, 4 in head; snout very long, 2 in head.

D. 6; A. 24; P. 10.

Description of a single specimen 27 mm. long, collected at Station 321, cruise 1929. Body short, scaleless, with a long head and short tail. Snout long, half of the head's length. Eye large, $\frac{1}{4}$ of the whole head. The long jaws are supplied with well developed teeth, unequal in size and sparsely set. No trace of scales, even hidden under the skin, along the lateral line or elsewhere.

Dorsal and anal originate on the same vertical. Pectoral rather long. All fins are filamentous with hairlike rays. Adipose small. Caudal forked.

Coloration.— Small stars of dusky pigment, sparsely set all over the body which causes a light grayish color. The anterior portion of the belly is dark because of blackish intestines, but the surface of the skin in this particular portion is metallic bronze with a kind of phosphorescence. There are some scattered phosphorescent spots on some other portions of the body.

Compared with two other species of Lestidium — *L. elegans* Parr (Bull. of the Bingham Ocean. Coll., **3**, 1928, Art. 3, pp. 44–76) and *G. atlanticum* Borodin (Bull. Vanderbilt Ocean. Mus., **1**, 1929, Art. 1, p. 10) — our specimen shows the following differences: its body is much shorter, the head and snout are longer, and the eyes are larger.

This specimen is probably immature, but may represent a new species.

GEMPHYLIDAE

Nesiarchus nasutus Johnson

Cruise 1929, Station 325. Specimen 790 mm. long (standard).
Cruise 1929, Station 322. Specimen 280 mm. long (standard).

This is a rather rare fish in the eastern portion of the Atlantic, known only from the region of Madeira and the deep waters off Portugal. On the smaller specimens a crustacean parasite was found attached in the skin and muscles, just above the gill opening.

BREGMACERATIDAE

Bregmaceros macclelandi Thompson

M. C. Z. No. 31,668, Station 117.

I was inclined at first to identify this fish as *B. atlanticus* Goode and Bean (1896, fig. 331), but a closer examination has shown that it is nearer to *B. macclelandi* Thompson, because it has two separate dorsal fins, with hardly visible short single rays between them, while *B. atlanticus* is described and figured as having one continuous dorsal with a lower median portion thereof. *B. macclelandi* Thompson has two separate dorsals like our specimen. (See Charlesworth's Mag. N. H., **4**, 1840, p. 184 and Day, Fishes of British India, 1878–1888, **2**, p. 418, fig. 151).

Two more specimens of this fish were caught at Station 321, cruise 1929.

MELAMPHAIDAE

Melamphaes bericoides (Borodin)

Proc. New Eng. Zoöl. Club, **10**, 1929, p. 110.
Type, M. C. Z. No. 31,627.

This fish combines characters of both Bericoid and Scopelid fishes. The structure of its cavernous head, with small mouth and short cleft, shows it belongs to the genus *Melamphaes*, but the general form of the

body, shape of scales, form of fins, recalls a Myctophid fish, from which it differs, however, by the structure of the upper jaw, which is not formed by the premaxillary bone.

Another specimen of this new fish, 160 mm. long, was collected at Station 322, cruise 1929.

Melamphaes mizolepis Günther

M. C. Z. No. 31,656, Station 117.

Large specimen, 108 mm. long (Günther's type was 76 mm.), with some scales still on the body and many others fallen off but preserved with the specimen. The scales (in spirits) are of milk-white color, their size 20 x 20 mm.; only sixteen scales along the lateral line. They resemble the luminous scales of some myctophids, and it is quite possible that they are phosphorescent. Their form and structure differs entirely from the scales of common fishes.

There are many more large specimens of the same species in the collection:

M. C. Z. No. 31,654, Station 118.
M. C. Z. No. 31,655, Station 119.
M. C. Z. No. 31,657, Station 144.

Melamphaes unicornis Gilbert

M. C. Z. No. 31,663, Station 144.
M. C. Z. No. 31,664, Station 143.

Melamphaes beanii Günther

(Syn. Scopelogadus cocles Vaillant)

M. C. Z. No. 31,660, Station 141.
M. C. Z. No. 31,661, Station 116.
M. C. Z. No. 31,662, Station 118.

Melamphaes megalops Lutken

M. C. Z. No. 31,658, Station 143.
M. C. Z. No. 31,659, Station 117.

Melamphaes nigrofulvus Garman

M. C. Z. No. 31,665, Station 117.
Cruise 1929, Station 323.

A large specimen, 80 mm. long.

Cruise 1929, Station 321.

Melamphaes crassiceps Günther

Cruise 1929, Station 319. 2 specimens.
Cruise 1929, Station 321. 6 specimens.
Cruise 1929, Station 323. 6 specimens.
Cruise 1929, Station 325. 10 specimens.

Caulolepis longidens Gill

M. C. Z. No. 31,666, Station 119.
Cruise 1929, Station 323.

Anoplogaster cornutus (Cuvier and Valenciennes)

Cruise 1929, Station 322. 1 specimen 35 mm. long.

TETRAGONURIDAE

Tetragonurus cuvieri Risso

M. C. Z. No. 31,667, Station 119.

This is a very rare and in many respects a peculiar fish, and it deserves special notice.

It was first discovered in the Mediterranean, and described by the Italian ichthyologist Risso in 1810. Later Cuvier and Valenciennes gave a full description of this strange fish in their capital work Histoire Naturelle des Poissons (**11**, 1836, pp. 176–186, fig. 318). Still later a specimen was collected in the eastern Atlantic and was described by Lowe, Fishes of Madeira, 1843–60, pp. 129–131, pl. 19, as *T. atlanticus*, but because it differed very little from Risso's, Goode and Bean considered it to be the same species (l.c., p. 230). The only specimen of this rare fish, reported previously from the Atlantic coast of North America, was taken near Woods Hole, Massachusetts (United States National Museum No. 44,436). Our specimen is, therefore, only the second from the western Atlantic.

It is only 54 mm. (a little more than 2 inches) long, and evidently young, as Risso's specimen was 13 inches, and Lowe's $9\frac{1}{4}$ inches long. Though the measurements of the head (near 4 in length, and of the eye, $3\frac{1}{3}$ in head) are nearer Lowe's description than to that of Risso-Cuvier, we are inclined to agree with Goode and Bean, that both are the same species.

The striking peculiarities of this fish as stated by Risso, then by Valenciennes, and later by Lowe, are:

1. Structure of mouth and particularly of lower jaw. Lowe writes on this subject: "When the mouth is opened the lower jaw presents a most remarkable appearance, from the extraordinary elevation of its sides, resembling enormously high gums, and shutting into or within the upper jaw, like the high raised sides of a box, or the arched end of a trunk with a round top within its lid. . . . The greatest height thereof exceeds half the length of the jaw. . . . Lower jaw resembles the hollow square stern of a ship or boat with steep high sides. . . . Frontal notch is very deep. Teeth in a single row. . . ." (p. 135).

2. About another peculiarity, the scales, he writes: "The whole body, the opercles, and the cheeks are covered with a peculiar kind of hard and compact armour of large close-set scales, elegantly and beautifully disposed, like neatly plaited braids of hair, in regular oblique subspiral rings, or arcuated lines, descending obliquely forwards from the dorsal to the ventral edges. There are 83 lines. On the caudal they are more keeled, scales are rhomboid longitudinally striate with the edge finely pectinociliate. Striae are composed of rows of distant imbricated spines or teeth. The surface is rough when the finger is drawn from the tail forwards, and silk smooth when the hand is drawn in a contrary direction" (p. 137).

3. Risso stated, and confirmed it by his own dangerous experience, that the flesh of this fish is a violent poison.

All authors agree that this fish usually inhabits great depths, and that it appears along shore or in the surface only occasionally. This is the reason why it has rarely been found. Cuvier and Valenciennes placed it among the mugiloids. Lowe considered it as belonging to the *Scombridae*, but Goode and Bean, Günther, and Boulenger rate it, and no doubt rightly, as a monotypic genus of a new family *Tetragonuridae*, which is placed between the *Sphyraenidae* and the *Stromateidae*. Jordan and Evermann also include in this family the genus *Chenodax* Maclay. But it must be admitted that, because of its rarity, nobody has studied the anatomical details of the structure of this species in order to find out its phylogenetic position. It is, therefore, much to be hoped that future deep-sea explorers may secure a sufficient number of this rare fish for anatomical research.

CERATIIDAE Regan [1]

Ceratias couesi (Gill)

M. C. Z. No. 31,650, Station 143, 85 mm. long.
M. C. Z. No. 31,651, Station 143, 43 mm. long.

The large specimen is somewhat damaged, the skin torn off and viscera exposed. Remnants of fish and crustaceans were found in the stomach. The eyes are hardly visible, and appear as transparent spots on the skin without any real sight organs beneath. The small specimen is in perfect condition.

LINOPHRYNIDAE Regan

Linophryne Collet

Linophryne longibarbata Borodin

Proc. New Eng. Zoöl. Club, **11**, 1930, p. 87.
Type, M. C. Z. No. 32,307.

This new species combines the characters of two others which are closely related, *L. lucifer* Collet and *L. coronata* Parr, having the general form of the body, belly, head, mouth and teeth similar to the first named, with the illicium and appendages of *L. coronata* Parr. But it differs from both of them in having a far longer barbel.

Another specimen of the same new species, only 35 mm. long (standard) was collected at Station No. 319. Its total length, together with caudal, 48 mm.; its barbel measure 71 mm. (twice the length of the body without tail).

ACERATIIDAE

Haplophryne Regan, 1912

Haplophryne simus Borodin

(Plate **4**, fig. 1)

Occ. Papers Boston Soc. Nat. Hist., **5**, 1930, p. 285.
Type, M. C. Z. No. 32,308, p. 285

It is difficult to find a proper place for this new fish in the revised system of the ceratoid fishes proposed by Regan. In the form of the

[1] Regan in his revision of Ceratoid fishes, 1926 (see Bibliography), formed ten families out of the old family Ceratidae. I follow his classification in this paper.

body and other very important characters, it must be referred to the nearest genus *Haplophryne;* but the presence of an illicitum and a translucent skin are the most important characters of this genus, while our fish has no illicitum (at least it could not be discovered without dissection or some manipulation liable to mutilate the unique specimen), and its skin is pigmented and not transparent.

In general form of the body it is nearest to *Aceratias mollis* Brauer (p. 324–325, pl. 16, fig. 10), which Regan included in his new genus *Haplophryne*, but our species has a differently shaped head with pug-shaped muzzle, different structure of nostrils, and a projecting lower jaw.

Mr. W. Beebe in a recent paper described the new species *Haplophryne hudsonicus* (Zoologica, **12**, No. 2, 1929). Our specimen has much in common with this new species, but differs from it in having a differently shaped snout and lower jaw, eyes oval (not round), skin dully pigmented (not transparent) and some other minor characters.

Parr (1930, see Bibliography), on the basis of an osteological study, gives a tentative key to the genera of allied pediculate fishes of the family *Aceratidae*. Applying the characters of his classification, our specimen can be included in the genus *Haplophryne* Regan, 1912, and no 1916 and 1926.

MELANOCETIDAE

Melanocetus krechi Brauer

(Syn. Melanocetus johnsoni Günther)

M. C. Z. No. 31,652, 20 mm. long, Station 117.

MALTHIDAE

Dibranchus atlanticus Peters

Cruise 1929, two young specimens (30 mm. with tail), Station 321.

PTERACLIDAE

Pteraclis fasciatus Borodin

(Plate **4**, fig. 2)

Proc. New Eng. Zoöl. Club, **11**, 1930, p. 91.
Type, M. C. Z. No. 32,120 and one smaller paratype.

This new species of *Pteraclis* differs from the four other known species, *P. papillo* Lowe from Madeira, *P. ocellatus* Cuvier and Valen-

ciennes from Canal of Mozambique, *P. carolinus* Cuvier and Valenciennes from the coast of California, and *P. velifer* (Pallas) from the Indian Ocean (Günther, Cat. Fish. Brit. Mus., **2**, pp. 410–411) by having a much shorter and higher body, well pronounced black vertical bands along the sides, absence of spines on the opercle and preopercle, cycloid scales without any spines, and a different radial formula.

APHAREIDAE

Aphareus obtusirostris Borodin

(Plate **5**, fig. 2)

Proc. New Eng. Zoöl. Club, **11**, 1930, p. 91.
Type M. C. Z. No. 32,199 and one paratype.

From the other known species of *Aphareus*, *A. furcatus* (Lacepéde) *A. fulvivultus* (Jenkins) and *A. rutilans* (Cuvier and Valenciennes),[1] the present one differs in having a strange looking, abruptly cut snout,

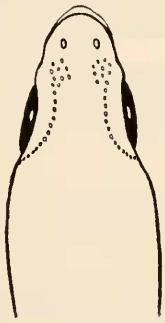

Fig. 1. — Head of Aphareus obtusirostris.

slightly curved in its general outline, and a peculiar decoration made of pores on the top of the head. The genus *Aphareus* was formerly included in the families *Lutianidae* and *Haemulidae*. In Jordan's Classification of Fishes a separate family *Apharcidae* was introduced.

This fish does not belong to the deep-sea fauna and was evidently taken at the surface. We include it in this paper because it was taken during the same cruise as the abyssal species.

[1] Jordan, Evermann and Tanaka. Notes on new or rare fishes from Hawaii. Proc. Cal. Acad. Sci. (4 ser.), **16**, 1927, p. 670.

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